

CLAIMS

1. Steam generator comprising an outer shell (2) of cylindrical general shape placed with its axis (6) vertical, a bundle (3) of exchange tubes (4) that are fastened inside a bundle wrapper (5) of cylindrical general shape placed coaxially inside the outer shell (2) so as to define, with one of the outer shell and of a skirt coaxial with the outer shell, an annular space for water from the steam generator to flow axially and a feedwater delivery device (10), at an upper axial end of the annular space (9), comprising a header (11) of toroidal general shape approximately coaxial with the outer shell (2) and with the annular space (9), at least one feed pipe (12) for the header (11) passing through the outer shell (2) and means (14) for distributing the feedwater in the upper part of the annular space (9), these means being formed by a plurality of openings (17) that pass through an upper wall of the toroidal header (11) and are distributed circumferentially on the wall of the header (11) and a plurality of substantially vertical distribution tubes (15) that are fixed by a lower end part, each at an opening (17) in the wall of the toroidal header (11), characterized in that the tubes (15) of the feedwater distribution means (14) are straight and placed vertically and in that each of the tubes (15) of the feedwater distribution means (14) has, in an upper end part, at least one water passage opening (20) passing through the wall of the tube (15) and a cap (16) that is fastened to the tube (15) and has a lateral surface of substantially cylindrical shape and a top covering the upper end of the tube (15), in an approximately coaxial arrangement, surrounding, with a radial clearance, the upper end part of the tube (15) through which the water passage opening (20) pass, one dimension of which is less than a characteristic dimension of foreign bodies contained in the feedwater of the steam generator.

2. Steam generator according to Claim 1, characterized in that the tube (15) of each of the water distribution means (14) includes, in an upper end part, a plurality of slots (20) of axial longitudinal direction that are distributed around the circumference of the tube (15) and having, in the circumferential direction, a width of less than a characteristic dimension of foreign bodies that it is wished to trap in the feedwater header (11).

3. Steam generator according to Claim 2, characterized in that the slots (20) of the plurality of slots of the tube (15) extend up to the upper end of the tube, at which end they emerge, and in that the cap (16) has a domed top, an inner surface of which includes a cavity for receiving the upper end of the tube (15) to which the cap (16) is fixed.

4. Steam generator according to Claim 3, characterized in that for each of the feedwater distribution means (14), the cap (16) is fixed to the tube (15) by means of fixing fingers (19) of substantially radial direction that are distributed around the periphery of the cap (16) and of the tube (15), each finger being welded onto an outer surface of the tube (15) and to the side wall of the cap (16).

5. Steam generator according to Claim 2, characterized in that the slots (20) passing through the wall of an upper part of the tube (15) of each of the feedwater distribution means (14) extend along the axial longitudinal direction up to a certain distance from the upper end of the tube (15) that includes a solid part at its upper end in which a plug (25) for closing off the upper end of the tube (15) is engaged, which plug has an upper end part (25') engaged in an opening passing through the closure top of the cap (16) in its central part, the plug (25) being welded onto

the end of the tube (15) and, via its end part (25'), onto the top of the cap (16).

6. Steam generator according to Claim 5, characterized in that passing axially through the plug (25) is at least one slot (26) placed at its periphery and opening onto the lateral surface of the plug, in a part of the plug (25) with a larger diameter engaged inside the tube (25) for closing off its upper end.

10 7. Steam generator according to any one of Claims 1 to 6, characterized in that the header (11) of the feedwater distribution device (10) includes at least one inspection opening (23) passing through the wall of the toroidal header (11) in an upper end part of the
15 toroidal header having removable closure means (22, 24).

8. Steam generator according to Claim 7, characterized in that the removable closure means (22, 24) of the inspection opening (23) in the toroidal header (11) are formed by a support ring (24), that is fixed by welding at the opening (23) passing through the wall of the toroidal header (11) in its upper part,
25 and by a cover (22) that may be engaged in the fixing ring (24) and fixed by bolts to the fixing ring (24).

9. Steam generator according to any one of Claims 1 to 6, characterized in that the header (11) comprises a
30 shell in the form of a portion of a torus extending along only part of parallel circular lines of the torus and bounded, at its ends, by meridional sections of the torus along which the toroidal shell of the header has inspection openings that can be closed by removable
35 closure means (28).